MCZ newsletter
MUSEUM OF COMPARATIVE ZOOLOGY

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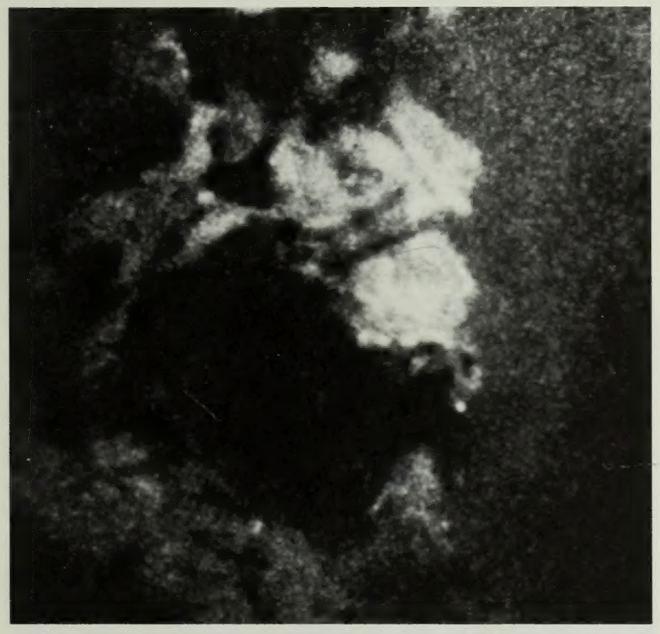
Philip J. Darlington, Jr.

IS THERE OR ISN'T THERE AN AQUATIC ANIMAL RESIDING IN LOCH NESS?

The recurring tantalizing possibility that there are one or more creatures in the cold deep waters of Loch Ness has been the subject of serious scientific inquiry, using advanced optical techniques, during the summer of 1975. The results will be presented by a panel of the investigators including (tentatively): Robert H. Rines, President, Boston Academy of Applied Sciences; Charles Wyckoff, President, Applied Photo Sciences (optical expert); Martin Klein, President, Klein Associates (sonar manufacturers); and Professor Harold Edgerton, *emeritus*, Massachusetts Institute of Technology (inventor of the strobe light and designer of the underwater strobe and camera equipment used for the experiment).



This picture was exposed of an object (probably the animal's head) at about 4 ft. in front of the camera. What appears as a protuberance on the axis of symmetry is about 6 inches back of band (mouth tip?) at the end of the axis of symmetry. Field of view of this picture is on the order of 5 ft. wide by 3 ft. high. This picture was exposed at 11:45 A.M. on June 20, 1975 in Urquhart Bay, Loch Ness. C. W. Wyckoff, 1/21/76

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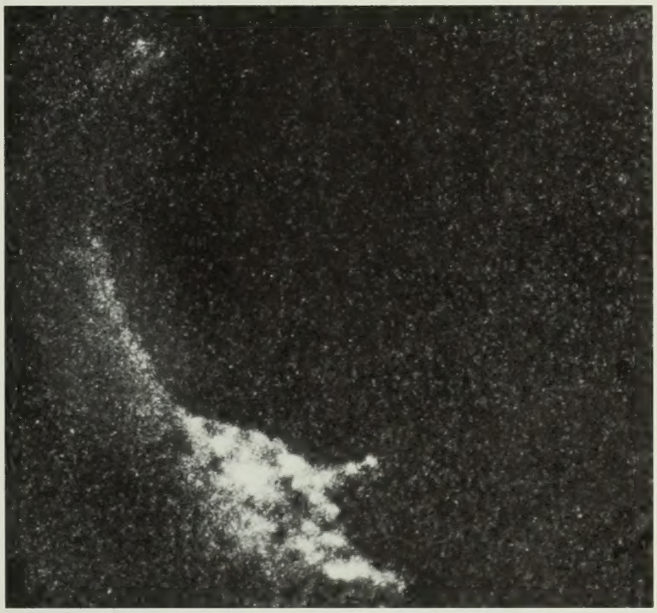

Animal's body is about 25 ft. away from camera with snake-like neck projecting towards the camera about 10 ft. What appears to be the tip of the nose at the top left is within the light beam at about 15 ft. from the camera and about 10 ft. out in front of the body. The body portion is about 6 to 8 ft. in diameter and somewhat cylindrical in shape. What can be seen appears to be about 8 ft. long. This picture was exposed at 4:40 P.M. on June 20, 1975 in Urquhart Bay, Loch Ness. C.W. Wyckoff, 1/21/76

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March 25, 1976 — 5:30 P.M. — Geological Lecture Hall, Harvard University

Mangora *web from Dr. Levi's backyard in Pepperell.*

SPIDER WEBS: VISIBLE MANIFESTATIONS OF BEHAVIOR

To most of us, cobwebs are merely a housekeeping nuisance or part of the standard staging effects for late-night horror movies. For the initiate, like Dr. Herbert W. Levi (Agassiz Professor of Zoology and Curator of Invertebrates) spiders' webs are not only one of the most remarkable feats of animal engineering, but also represent a fascinating problem in the evolution of behavior.

Dr. Levi's particular area of interest is a group of spiders called the orb-weavers, whose webs are roughly round in shape. (Other spiders use other shapes, including oblong and "crazy-quilt" irregular patterns.) There are over 3000 species of orb-weavers, and each species has its own web, as individually distinct as human fingerprints. The differences are not only in structure, but more importantly, in when and how they are used.

Most members of the genus *Araneus,* for example, are nocturnal but leave their webs up during the day. *Araneus diadematus,* however, builds a new web just before daybreak each morning and tears down all but the frame lines during the night. *Acacesia hamata* makes its fine-meshed web at dusk and hauls it in at daybreak, apparently hiding from its predators until building anew the following evening. *Verrucosa arenata* makes a large, loose web low in the trees; *Wixia* is believed to make its web high in the trees and probably rests hidden from its enemies by pressing close to a twig. The *Scoloderus* web is a long narrow strip, with its round hub crowded into one end. Many orb-weavers take their webs down in the rain, but *Cyrtophora,* whose web differs from the others in that it is not sticky, a disadvantage, counters this handicap by being able to keep it up during rain. Although its web is energy-consuming to construct, and not a very efficient insect trap, it takes advantage of the abundance of insects that follow a tropical downpour.

The nature of the prey that their webs attract can also affect the behavior of these spiders. Butterflies and moths can shed the delicate scales that cover their wings, and so escape from the spiders' clutches. Consequently, spiders have learned to bite these insects *before* wrapping them, instead of the other way around, as they do with flies.

Much remains to be learned about just what these specialized webs are for and how spiders evolved the complicated behavior needed to construct them. This February and March, Dr. Levi will be studying and photographing orb-weavers and their webs in the area of the Archbold Biological Station in southern Florida. Dr. Levi hopes to add to the data he is compiling in collaboration with behaviorists Dr. Eberhard of Colombia and Dr. Robinson of the Panama Canal Zone. In May, Dr. Levi will share some of his latest findings with the Friends of the MCZ.

ELISABETH DEICHMANN

1896-1975

Elisabeth Deichmann was associated with the MCZ for 47 years — from 1928 until her death on August 9, 1975. A native of Copenhagen, where she earned her Masters Degree in Zoology, she received her Ph.D. from Radcliffe in 1927 and then became an Agassiz Fellow. In 1930 she was appointed Assistant Curator of Marine Invertebrates, Curator from 1942-1961, and Honorary Curator from 1961 until her death. Her lifelong research interests were corals and sea cucumbers.

After World War II, Dr. Deichmann received King Christian's Freedom Medal for help to Danish seamen and others during the war. A second decoration from the King of Denmark named her a Knight of Dannebrog, one of the first women to be so honored, for her distinguished zoological work and her continued interest in helping Danish students and Danish culture.

Elisabeth Deichmann, center, with associates, Fall, 1946.

Liska is remembered by many associates for her helpfulness and her teas. Visitors and newcomers to the museum were invited in the afternoon to share her extraordinarily strong brew and to listen to her fascinating stories of the MCZ during the Henshaw and Barbour administrations. Many of us will long remember Liska, small dog in tow, compressing her large stature into her tiny Volkswagen.

PHYSIOLOGICAL BASIS FOR SOCIAL BEHAVIOR IN LIONS STUDIED AT CONCORD FIELD STATION

The cool independence of the house cat has long been pointed out by lovers of the dog and other less aloof animals. Most members of the cat family, in fact, prefer to keep their own company, particularly when hunting for food. The lion, on the other hand, lives and hunts in groups, and would probably have a hard time surviving on its own. Why? Alexander Agassiz Professor C. Richard Taylor and students Pamela Chassin, Howard Seeherman, and Norman Heglund think the reason may be physiological.

Lions, like many creatures of noble birth, are notoriously lazy. They spend an average of only two hours a day walking and less than one hour a day eating. This leaves 21 hours a day (or 85% of the lion's time) for lounging. Also, compared with their close relatives and even their own prey, lions can't run very fast or for very long. Top speed for a lion is only about 30 miles per hour (48-59 km/hr) compared to 71 mph for a cheetah and 61 mph for an antelope. Since they can't outrun their prey, lions have to cooperate to trick them into ambush, surprise them, or overpower them with their great strength.

One reason for the lion's poor running performance could be that lions, like many humans, are simply "out of shape" (not difficult to imagine for someone who just lies around 85% of the time). To make sure that the lions they used were not suffering from a sedentary middle age, the researchers acquired two very young lions, housed them at the Concord Field Station, and ran them through a rigorous training program on a treadmill every day.

Another reason for using young lions was their size. A full grown lion, weighing close to 300 pounds, is a bit difficult to handle even if you're an experienced lion tamer. Even a half-grown lion of about 120 pounds can easily overpower a human. To avoid being flattened by a careless paw, the researchers borrowed two two-month old male lions from Warner Brothers Jungle Habitat in New Jersey (weighing about 28 pounds), housed them at the Concord Field Station, worked with them for seven months, and returned them when they weighed about 125 pounds. The lions were trained to walk and run on a treadmill wearing a specially made ventilated mask. The treadmill was used in the running experiments as well as to keep the lions in shape, and the masks measured the oxygen the lions used while exercising. The researchers also used stop watches and movies to measure the stride frequency of the lions, took blood samples to help analyze the lions' metabolism, and made plaster casts of the lions' legs to help analyze the effects of their mass on the lions' movements.

The researchers found that the lions' running metabolism is dramatically different from any other mammal known. A lion burns up considerably more energy in just moving around than other mammals its size. In fact, the energy input a lion needs to reach its top reported speed of 36 miles per hour would send another mammal of the same weight up to 120 miles per hour!

Professor Taylor and his associates have measured the energetic costs of running for 11 species of mammals, ranging in weight from mouse to horse, and have developed a formula for predicting the amount of oxygen an animal will consume given its weight and speed. The lion is the only animal so far that consumes a significantly higher amount of oxygen (and thus energy) than predicted. The lion takes longer strides to travel at a given speed than other animals of its weight, and although the lion's legs are about the same length as those of the cheetah and the gazelle, they are much heavier, with nearly twice as much mass.

Professor Taylor and his colleagues are now using high-speed films and force plates to help determine exactly why lions need so much more energy to run than other mammals. In the meantime, they have already proved that the lion's habit of hunting in groups is an animal form of energy preservation, necessary for survival, and not just a social event.

Two lions displaying their massive limbs and demonstrating how they spend 85% of their day.

PUBLIC EDUCATION PROGRAM LAUNCHED AT THE MCZ

Last fall classes from the Donald McKay School in East Boston and the Martin Luther King Middle School in Dorchester became the first participants in a public education program at the MCZ. Using a specially renovated room in the Geology Museum, students learned about animals and their origins under a grant for magnet education from the State Board of Education. Both the schools involved are "Magnet Schools" with the specific aim of attracting students by the excellence of their offerings. Classes are taught by two museum teachers — Carla Gordon and David Ebert; Peter Walsh was instrumental in developing the curriculum which includes some very well-received games, notably "The Last of the Dinosaurs," a board game where the winner is the player whose three dinosaurs succeed in avoiding extinction the longest.

Each student attends the MCZ's program eight times and then receives another natural history experience at the Franklin Park Zoo. In the Spring all the students will attend an outdoor full-day session at the Concord Field Station.

A second program, "Animals in Human Culture," started in January. Fifth and sixth grade students from the Fuller School in Jamaica Plain and the Robert Gould Shaw Middle School in West Roxbury will attend a total of one full-day a week for ten weeks. Their entire course of study during the ten-week period will focus on how different human cultures have lived with the natural world by examining and recreating their way of life including "making a living" (hunting/farming), dance, art, music and ritual. The cultures being studied are Africa and American Indians.

Plans are underway to expand these programs to other communities including Cambridge, Somerville, and Chelsea.

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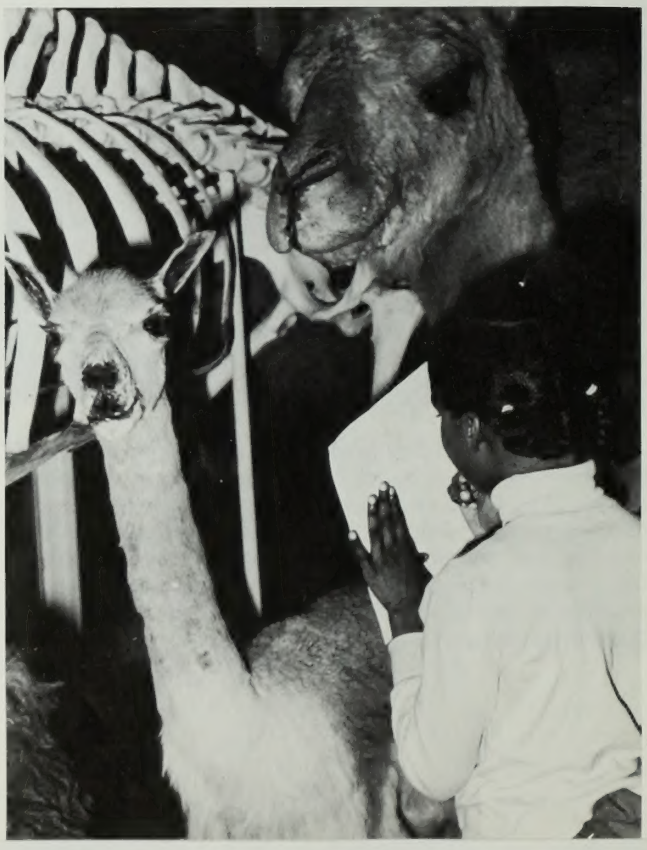

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a. Museum teacher Carla Gordon with Donald McKay School students
b. Peter Walsh with Martin Luther King School students
c. King School students
d. A student from McKay School
e. Fifth-grade McKay School teacher Joan Cullen with students
f. King School couple
g. Sixth-grade King School teacher Jeffrey Rosenberg with students

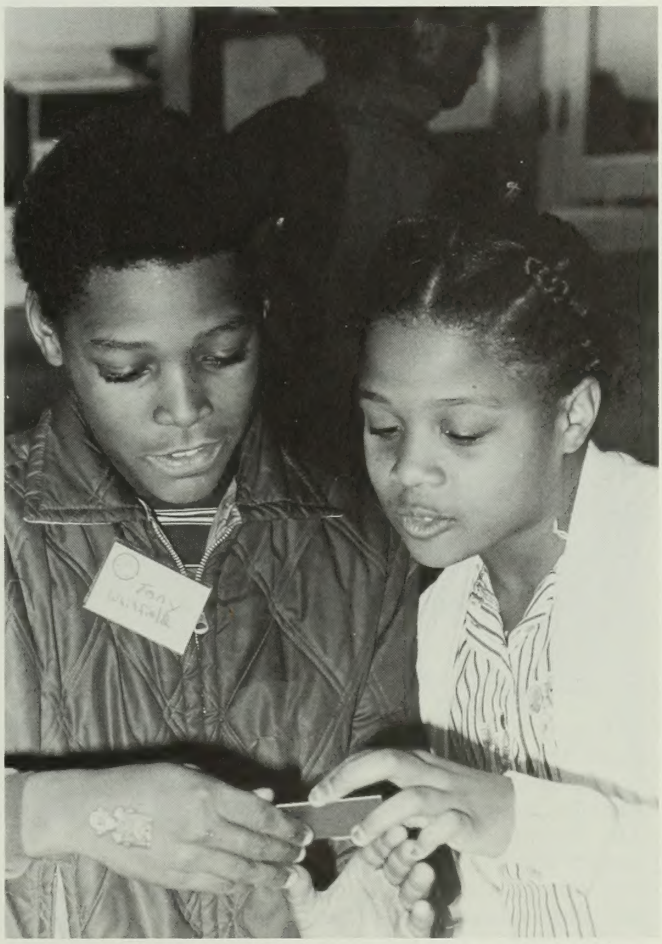

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Photo a by Rick Stafford
Photos b, c, d, e, f, g by George Sheng

PUBLIC PROGRAMS PROLIFERATING!

SPRING DRAWING COURSES

Karen S. Velmure

Whitney Powell

Karen S. Velmure, botanical illustrator for the Arnold Arboretum, and Whitney Powell, staff artist for the Peabody Museum of Archaeology and Ethnology, are offering drawing courses at the MCZ this Spring. Ms. Velmure's course, entitled *Drawing from Nature,* covers the basics of drawing from natural specimens; Ms. Powell's *Scientific Illustration* course covers technical illustration from first rough drawing to final publication.

The demand for these courses seems endless — an evergrowing number of aspiring students are adding their names to the waiting list.

ART OF THE BOOK WORKSHOPS

Four all-day workshops, organized by Mary Keeler of the MCZ Library, will be held in April and May covering:

1. *Paper Making:* Bob Hauser and Helena Wright of Busyhaus
2. *Marbling Paper* (learn how!): Sam Ellenport of Harcourt Bindery
3. *Matting and Framing:* film from Smithsonian Institution. Instructor to be announced.
4. *Leather Treatment and Simple Book Repair:* Mary Keeler

There will be a separate charge for each session. Dates and details will be announced shortly.

VOLUNTEER TRAINING PROGRAM

Kate Walton, an intern in Museum Education from George Washington University, is organizing the first volunteer training program for the Harvard University Museums this winter. A publicity campaign that received a response unprecedented in the MCZ's experience has attracted an outstanding group of enthusiastic trainees. Upon completion of the 12-week training program, volunteers will guide school groups through the public exhibits paying particular attention to areas currently being studied by the visiting class. In some cases they will visit the class prior to their museum field trip and prepare students through the use of slide talks and artifact and specimen kits. The staffs of the four museums involved have responded with interest and cooperation to this first organized effort to make schoolchildren's visits more educationally meaningful.

Kate Walton

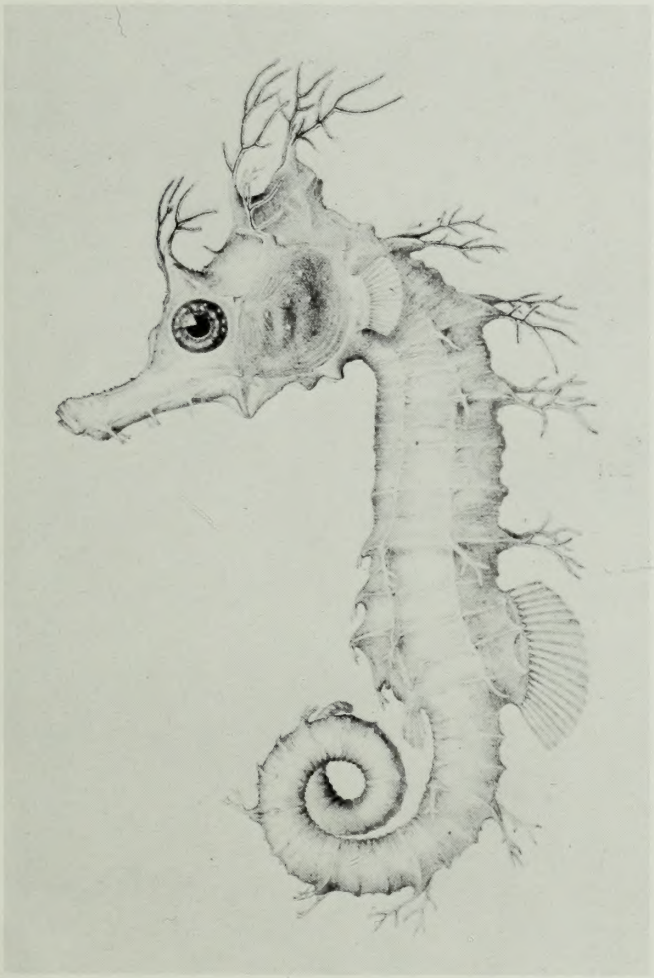
Special Exhibition

DRAWN FROM NATURE

A selection of scientific illustrations by artists and naturalists 1805-1890

These extraordinary examples of 19th century draftsmanship trace the transition from natural history to modern biology. The works of Alexander Wilson, G. B. Sowerby, Jr., Louis and Alexander Agassiz, Andrew Garrett, Jacques Burkhardt, and Auguste Sorel are among those on display, many for the first time, as part of a special exhibit on the MCZ's third floor February 26 - April 16, 1976. Exhibit Director/ Designer Carol Campbell, Peter O'Connell and Frank Brosnihan of the Exhibits Department, and Archivist Ann Blum have collaborated to mount this exhibition.

The opening will be marked by a talk by Sarah Landry entitled "Art from Biology: a sampling of biological illustration, 18th-19th centuries," which will be a guided tour of some traditions, hidden treasures, surprises, and visual delights, past and present, including works from the MCZ's own archives.



Hippocampus kincaidi, *1868-69 by James Henry Blake, 1844-1941. This pencil drawing from the MCZ's archives now graces notepaper available from the MCZ Shop.*

TRIP ROUND-UP

Colombia

Dr. R.A. Paynter, Jr., Curator of Birds, and a group of 10 are in Colombia as of this writing. They left on January 19 and return January 30.

Baja

Both boats are filled! The marine mammal expert accompanying the March 1-8 trip will be John H. Prescott, Director of the New England Aquarium, a native of Southern California who is on intimate terms with the whales, elephant seals, sea lions and dolphins that abound in the Baja region. A lively orientation dinner on January 16 gave prospective voyagers a preview and provided yet another reunion for last year's veterans.

Provincetown

There are a lot of whales to be seen in New England waters and Captain Arthur Avellar of the Dolphin III and his crew will take 75 Friends of the MCZ to view them off Provincetown on April 24. William E. Schevill will accompany the group and thinks the chances of seeing finbacks and humpbacks are excellent. Details and a reservation form will be available soon.

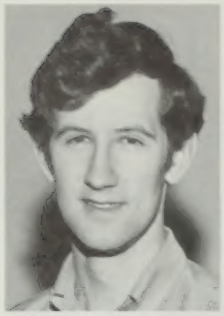
The MCZ Newsletter is published three times a year by the Museum of Comparative Zoology, Harvard University, Oxford Street, Cambridge, Massachusetts 02138; A. W. Crompton, Director.

Editor: Gabrielle Dundon
Photographers: A. H. Coleman
Paula Chandoha

NORMA LINN LEAVES

Norma Linn with Director A. W. Crompton

Norma L. Linn, the MCZ's indefatigable financial assistant for the past six years, has left to accompany her husband on a two-year postdoctoral stint in Edinburgh. Honored at the MCZ Christmas party with song, dance, and gifts, her lively presence will be missed by all.



FROM THE FIELD STATION

By William K. Newbury

Chainsaws and loggers in the Estabrook Woods? Isn't that the area preserved by the University for biological research? How can cutting trees be compatible with that?

In fact the cutting is the focus of a new research program of the Concord Field Station. It will, however, be restricted to a small portion of the Woods. The purpose of this program is to demonstrate how a woodlot can be managed and to study the environmental effects of cutting on the forest.

To accomplish this the Field Station has identified four study sites of 10-20 acres apiece. Three of the areas will be cut each in a different fashion while the fourth will be left untouched. One of the areas will be managed to improve its aesthetic appearance, one will be managed for the protection and encouragement of wildlife, and one for the production of timber and wood products.

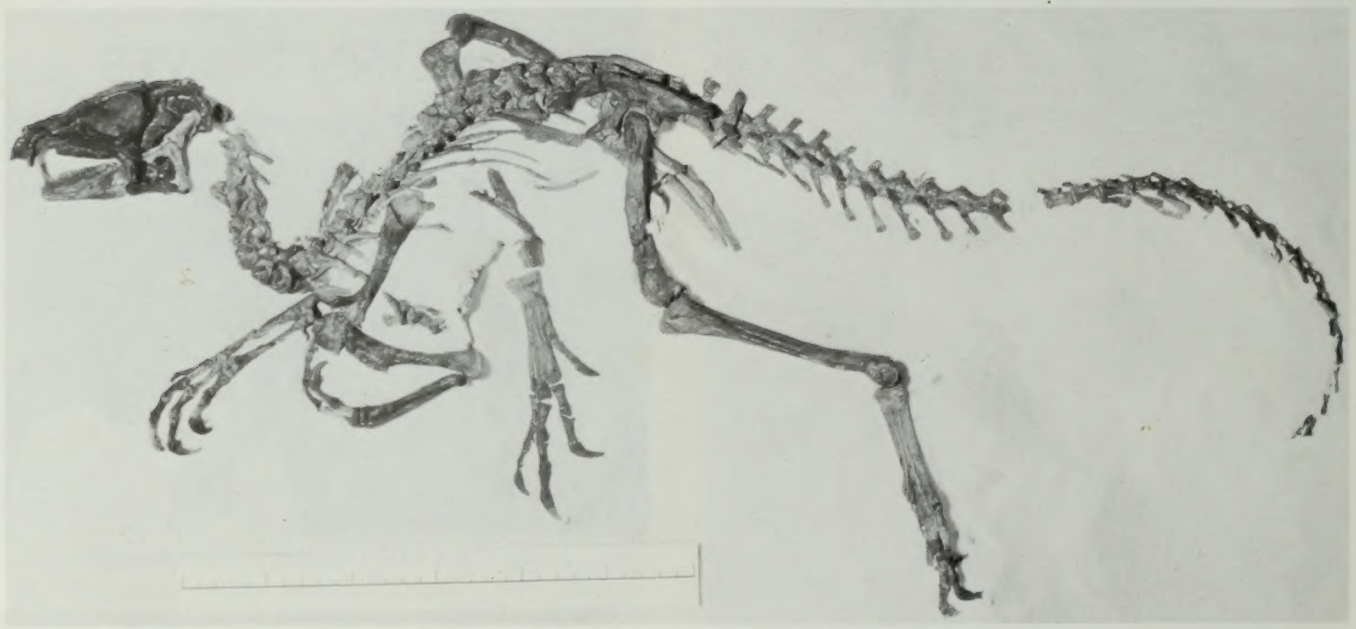
With the help of a half dozen local area students, the work on the aesthetic enhancement section was completed this past summer. The cutting in the timber management tract, which will only take two or three days, will take place this winter. The cutting in the wildlife section will be conducted at the end of this year after a census of resident bird and mammal species has been completed.

The Field Station is undertaking this project because of the increasing recreational and financial pressure on woodlands close to metropolitan areas such as Boston. Many individuals and communities are acquiring forested lands in an attempt to preserve them. Yet few of these owners have sufficient understanding of how to maintain these woodlands. Forests are not simply preserved through acquisition. There are many natural forces such as storms, insect pests, and plant succession which are continually reshaping the landscape.

Proper management can, however, preserve and even enhance the value of a woodland. Land with tall, straight trees that can be harvested is more valuable than land covered with a tangle of curved and slow growing trees. In addition, the latter type of forest is often unattractive and provides little recreational opportunity. Equally important, the tax assessment of forest land can be significantly reduced if the woods are managed and the plan for the management is approved by the state.

Obviously, forests will continue to change but the Field Station's aim is to demonstrate that the rate and direction of that change can be modified through proper management, and thus enable the landowner to preserve the qualities of his woodland that are most important to him.

FIRST WHOLE SKELETON OF A DINOSAUR FROM 180 MILLION YEARS AGO



This very small (only 42 inches from tip to tail) ornithiscian dinosaur lived when the Red Beds of South Africa were deposited (180 million years ago). Formerly known only from a broken skull, this complete skeleton was found on an expedition led by Director A.W. Crompton in Herschel, South Africa in 1966. The difficult task of removing the fine bones from a very stubborn matrix was recently completed by Arnold Lewis. By studying this specimen, Professor Crompton and graduate student Albert Santaluca are attempting to add another piece to the puzzle of how, why and when this major group of dinosaurs arose and why the mammal-like reptiles that once dominated the earth were to a large extent replaced by dinosaurs.

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